

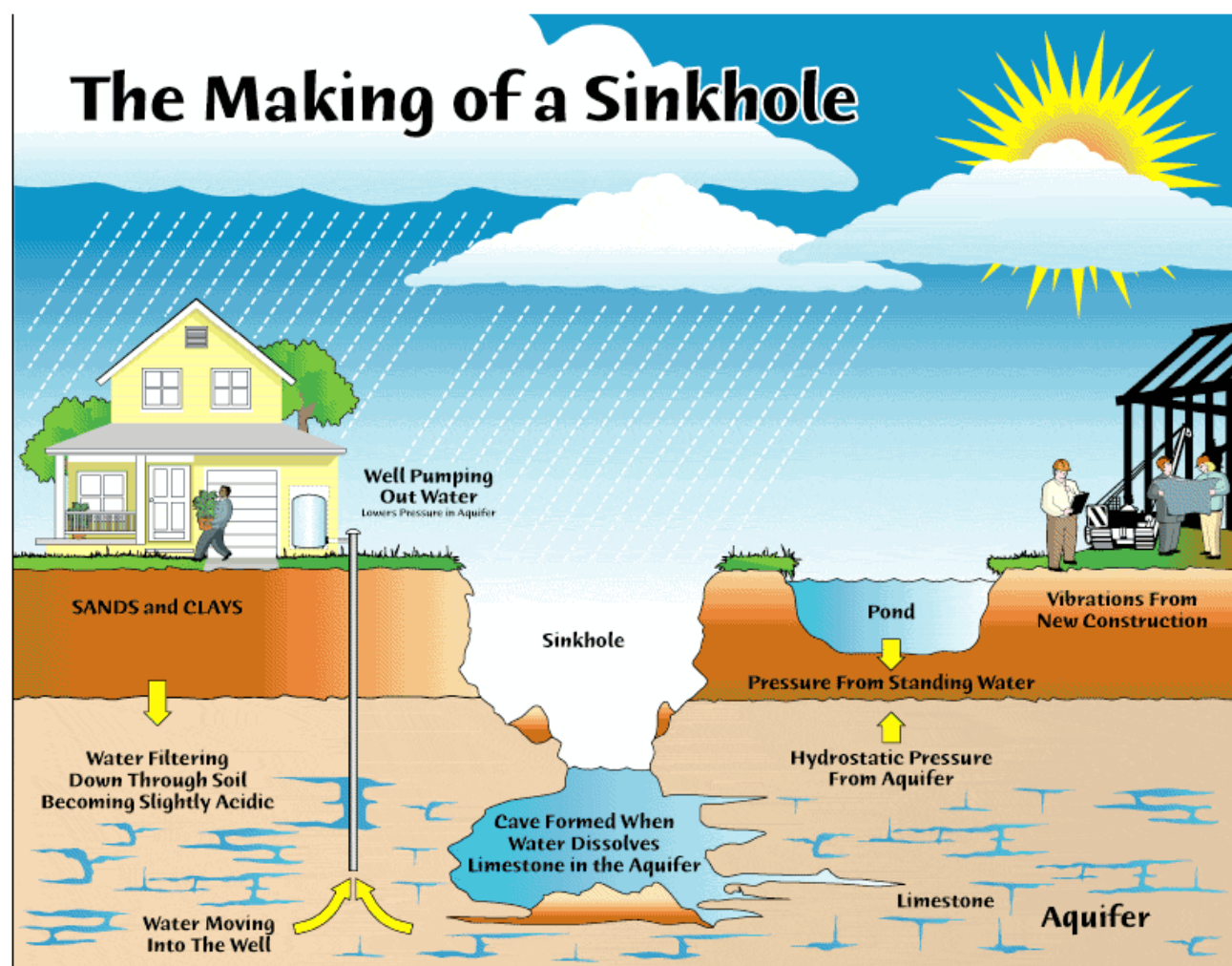
## Sinkhole Information for Lake County Residents

Sinkholes are a common naturally occurring geologic phenomenon and one of the predominant land forms in Florida. Many of the lakes in Florida are relic sinkholes. They are typically circular but can develop in other shapes depending on the soils and geology. Sinkholes can be classified as geologic hazards sometimes causing extensive damage to structures and roads resulting in costly repairs. Sinkholes can also threaten water supplies by draining unfiltered water from streams, lakes and wetlands directly into the aquifer (underground water supply).

Some of the most asked questions about sinkholes are:

### ***What is a sinkhole?***

Sinkholes are depressions or holes in the land surface that occur throughout central Florida. They can be shallow or deep, small or large, but all are a result of the dissolving of the underlying limestone. Hydrologic conditions, including lack of rainfall, lowered water levels, or, conversely, excessive rainfall in a short period of time, can all contribute to sinkhole development.



### ***What does a sinkhole look like?***

Sinkholes can come in many different sizes and shapes. They range from shallow depressions a few inches deep and several feet across to giants that can swallow multiple houses. The sides of the sinkhole may be gently sloping or they may be vertical. There are generally three types of sinkholes.

**Limestone Solution Sinkholes** – Along the western portion of Lake County, limestone is exposed at the surface or is covered by a thin layer of soil. This leaves the limestone subject to both physical and chemical processes that break down the rock. When this breakdown occurs, it usually forms a saucer or bowl-shaped depression. Due to the natural dissolving of limestone, these sinkholes develop continuously, but slowly.

**Cover-Subsidence Sinkholes** - Where the sand layer may be as thick as 50 to 100 feet, with very little clay below it, the dissolving limestone is replaced by granules of sand that cascade down to fill the void. This type of sinkhole is referred to as a cover-subsidence sinkhole. These sinkholes are only a few feet in diameter and depth. Their small size is due to the fact that the cavities in the limestone cannot develop to appreciable size before they are filled with sand.

**Cover-Collapse Sinkholes** - Generally, the deeper the soils, more clay is present in the soils. This clay provides some cohesiveness to the soil material above it, allowing it to bridge an existing cavity in the limestone. If this "bridge" collapses, it results in what is called a cover-collapse sinkhole. See the graphic above. The size of the sinkhole depends upon the size of the cavity. Cover collapse sinkholes form the same way as cover-subsidence sinkholes but differ mainly in the bearing strength of the soil above the cavity and whether the sinkhole subsides slowly or collapses abruptly.

### ***What can cause a sinkhole to form?***

Rainfall absorbs carbon dioxide and reacts with decaying vegetation, creating slightly acidic water. When this water reaches the limestone aquifer, it moves through spaces and cracks slowly dissolving the limestone and creating a network of cavities and voids. As the limestone dissolves, pores and cracks are enlarged and carry even more acidic water. Water not only contributes to the chemical dissolving of the limestone but it also affects the support or lack of support provided to a cavity when the water level changes. A sinkhole is formed when the land surface above a cavity collapses or sinks into the cavity or when surface materials are carried downward into the voids.

A natural drought or the pumping too much groundwater can leave underground cavities empty. This can make conditions favorable for sinkholes to form. Also, heavy rains following a drought often cause enough pressure on the ground to create sinkholes.

Sinkholes can be triggered by human activities such as:

- Over pumping of groundwater
- Diverting surface water from a large area and concentrating it in a smaller area
- Artificially creating ponds of surface water
- Drilling new water wells
- Construction of roadways or structures

Sinkholes are hazardous because they can destroy highways and buildings. Sinkholes also can cause water quality problems. During a collapse, surface waters may leak into the aquifer, our underground source of drinking water.

### ***Where do sinkholes occur?***

Sinkholes can occur in all parts of Lake County although some areas are more prone to sinkhole than others.

### ***What are Sinkhole Warning Signs?***

- Fresh exposures on fence posts, foundations or trees that result when the ground sinks around them;
- Slumping, sagging or slanting fence posts, trees or other objects.

- Doors and windows that fail to close properly or exhibit changed behavior such as doors remaining open where they had previously closed of their own accord.
- Small ponds of rainfall forming where water has not collected before.
- Wilting of small, circular areas of vegetation. This happens because the moisture that normally supports vegetation in the area is draining into the sinkhole that is developing below the surface.
- Cloudy water is pumped from nearby wells where the water was previously clear.
- Cracks in walls, floors, pavement and the ground surface. This is most noticeable in a concrete block structure and is different from a few hairline cracks normally seen between blocks.

***If it is not a sinkhole, what else can cause depressions or structural damage?***

There are many other circumstances that can cause depressions or sinkhole-like damage to structures.

- Buried debris from past construction activities that has settled or rotted over time
- Old trees that were cut down with the roots left to rot in the ground
- Improper compaction of the soil during filling and/or construction
- Structures built on organic soils (muck and peat) or clays
- Damaged septic tanks or other underground tanks
- Leaky water lines
- Broken sewer or stormwater pipes
- Wells with improperly installed casings



***What to do if a sinkhole opens on your property:***

- Keep children and animals away!
- Make sure the area is fenced or roped off clearly. In some areas a local enforcement agency may be able to assist. The property owner could be liable if someone is hurt in the sinkhole.
- Damage to your house or other structure (but not to your land) is generally covered by homeowner's insurance policies. If your home is threatened or damaged, contact your insurance company.
- If damage to your house occurs, get out immediately! You may be able to go back and retrieve valuables once a professional has determined that the situation has stabilized.
- You may want to consult with a soils testing firm to evaluate the cause at your own expense. A list of consultants is available from Water Resource Management.
- If lake or river levels are affected, or you think ground-water quality is endangered by a sinkhole, please report it to the Water Management District.
- Monitor for signs that the sinkhole is enlarging, especially toward buildings, septic tanks, drain fields, or wells (flowing water into a sinkhole will continue or even accelerate its growth). You can monitor the hole by marking the sides with stakes or paint. You can also use a thin hard metal rod that can be pushed into the soil. Areas near the sink will offer less resistance to the rod than the unaffected soil.
- Monitor damage to structures. The width of cracks on houses can be measured and the size recorded by pencil or marker. If damage is severe, water, gas and electricity should be turned off and the Fire Department notified.
- Do not throw any waste into the sinkhole. Fill the hole only with clean sand.
- Do not use the sinkhole as a drainage system. Pesticides and other wastes seep easily through the sinkhole and into the aquifer - your drinking water.
- Generally, the size of a sinkhole will not increase after the first day or two except where the vertical banks collapse to form less steep slopes. However, where there is water flowing into the hole it may continue to expand.

**For more information contact**

**Lake County Water Resource Management (352) 343-3776 ext 7208 or  
Lake County Emergency Management (352) 343-9420**

This information has in part been adapted from publications of the Southwest Florida Water Management District, the St. John's River Water Management District and other sources.